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EXTRAIT

An Outline of the Historical Phonology of Indo-European.

PAR

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# PHONÉTIQUE ET PHONOLOGIE

## Domaine indo-européen.

### An Outline of the Historical Phonology of Indo-European.

*Abstract.* — The development of the Proto-Indo-European phonemic system is traced from its Pre-Indo-European origins down to the stage directly preceding the emergence of the daughter languages. Four basic periods of development are postulated: 1) the phonemic stress stage, 2) the phonemic pitch stage, 3) Late Indo-European, and 4) Disintegrating Indo-European.

#### 1. *Introduction.*

1.1. Indo-European, like every other language living or dead, attested or reconstructed, passed through various stages of development. Unlike the history of attested languages such as English or French, for example, whose development is fairly well documented, the history of a reconstructed language is not based upon the evidence of written records but upon the conclusions drawn from the examination and analysis of all data relative to the phonological, morphological, and, to a lesser extent, syntactical similarities of two or more cognate languages. The conclusions so reached must then be placed in chronological perspective, distinguishing, as far as the data will permit, any definite, orderly connections between consecutive periods of change (cf. HOENIGSWALD 1960).

1.2. The purpose of this work is to outline the phonological development of the Indo-European parent language, with special emphasis being placed upon the development of the system of vowel gradation. An earlier version of this paper was presented at the Summer Meeting of the Linguistic Society of America on Saturday, July 29, 1972, in Greenlaw Auditorium, University of North Carolina at Chapel Hill.

Future articles will deal in depth with many of the points discussed in the present article.

2. *Pre-Indo-European.*

## 2.1. Pre-Indo-European phonemic system:

## A. Consonants:

<i>b</i>	<i>p</i>	<i>d</i>	<i>t</i>	<i>g</i>	<i>k</i>	<i>G</i>	<i>q</i>		<i>ʔ</i>
			<i>t̥</i>		<i>k̥</i>		<i>q̥</i>		
		<i>s</i>	<i>ɣ</i>	<i>x</i>				<i>ʃ</i>	<i>ħ</i> <i>h</i>

## B. Vowels:

<i>a</i>	<i>i</i>	<i>u</i>
<i>ạ</i>	<i>ị</i>	<i>ụ</i>

## C. Resonants:

<i>y</i>	<i>w</i>	<i>m</i>	<i>n</i>	<i>l</i>	<i>r</i>
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## 2.2. Notes (cf. § 3.9):

- A. *p*, *t*, *k*, and *q* can have non-phonemic aspirated allophones.
- B. *G*, *q*, and *q̥* are pronounced with lip-rounding.
- C. *t̥*, *k̥*, and *q̥* are glottalized stops.

2.3. The phonemic system postulated for Pre-Indo-European is arrived at in three ways. First, through the internal analysis of the Indo-European parent language, it is possible to work backwards, following the main lines of development as they are evidenced by their remnants, to a point that pre-dates anything recognizable as the form of Indo-European usually reconstructed by a direct comparison of the daughter languages. This process is commonly called "internal reconstruction". It should be emphasized here that great caution must be exercised, for the farther back one goes into the prehistory of a reconstructed language, the less sure the reconstructions become. Just about the only way that such reconstructions could be verified would be through the discovery of new daughter languages whose lines of descent differ vastly from those of the other daughter languages. In the case of Indo-European, we are extremely fortunate in this regard (cf. § 4.5). We will deal with the various stages of development in later sections.

Next, the reconstructed proto-language can be directly compared with other proto-languages, and conclusions can be drawn from this comparison. We shall restrict ourselves to a comparison of Proto-Indo-European and Proto-Semitic though interesting parallels also exist with Proto-Kartvelian (cf. GAMKRELIDZE 1967: 707f.). That the phonological systems of Proto-Indo-European and Proto-Semitic are ultimately related will be demonstrated by selected lexical comparisons. However,

not all details are clear at this stage of research, especially since one must not overlook the fact that though there are obvious affinities between Proto-Semitic and its cognates within Afro-Asiatic, the exact phonetic correspondences have yet to be completely worked out and many questions remain about the number and nature of the Afro-Asiatic proto-phonemes (cf. HODGE 1971: 12f.).

Finally, typological comparisons must be made to determine whether or not the reconstructed phonemic system is reasonable (cf. JAKOBSON 1971: 523f.).

2.4. The question now arises that if a relationship between the Semitic languages and the Indo-European languages can indeed be proved, just how far can we go in reconstructing the phonology and morphology of their common ancestor? I think that we will be able to reconstruct the phonological system of this hypothetical ancestor with a fair degree of certainty. I would not be so presumptuous, however, to make the same claim for morphology. As I see the situation, Proto-Semitic and Pre-Indo-European parted company many millennia before the development of the proto-languages that one finds reconstructed in the standard handbooks. During this long period of relatively independent development, each proto-language went its own way. It is this gap between the separation of the two proto-languages and the emergence of Indo-European proper that is difficult, if not impossible, to reconstruct. Internal reconstruction allows us to go just so far.

This can be illustrated by looking at one small item, namely the Indo-European instrumental case. We can say with some assurance that the ending usually reconstructed as *\*-bhi* is of fairly recent origin, though obviously of Indo-European date. Since it is not found in Anatolian, we can surmise that it came into use after the separation of the Anatolian languages from the main speech community. Thus, we can remove the commonly reconstructed form of the instrumental case from consideration as something that would have a counterpart in Semitic. This is fine, but what preceded the use of the ending *\*-bhi* in Indo-European? This is probably something we will never know. One thing is certain, however; the speakers of the form of Indo-European before the appearance of *\*-bhi* must have indicated the instrumental in some manner.

Though of varying degrees of antiquity, the greater part of the Indo-European morphological system may be assumed a priori to have taken on its basic characteristics after the separation of Proto-Semitic and Pre-Indo-European. Thus, I do not think that we will be able to reconstruct the morphology of the ancestor of these two proto-languages. All we can hope for is the recovery of vague similarities.

2.5. Proto-Semitic is customarily assumed to have had the following phonemes (cf. MOSCATI 1964: 22f.):

A. Consonants:

*b p d t ḏ θ z ś g k ʔ*  
*ṭ ṭ̣ ṭ̤ ṣ ḵ*  
*s ḥ š ʕ x ʕ ħ h*

B. Vowels:

*a i u*  
*a· i· u·*

C. Resonants:

*y w m n l r*

It should be noted that the following consonants have fairly good correspondences in the cognate Afro-Asiatic languages (cf. HODGE 1971: 12): *b, p, d, t, s, g, k, ʔ, y, w, m, n, l, r*.

2.6. Notes:

- A. *ḏ, θ, and ṭ < d, t, and ṭ* (cf. DIAKONOFF 1974: 595).  
 B. *z, ś, and ṣ < g, k, and ḵ* (cf. DIAKONOFF 1974: 595; VERGOTE 1971: 44).  
 C. *ṭ, ṭ̣, ṭ̤, and ḵ* are glottalized consonants (cf. MOSCATI 1964: § 8.2).

2.7. Proto-Semitic/Indo-European phonetic correspondences:

PS	Revised IE	Traditional IE
<i>b</i>	<i>b</i>	<i>bh</i>
<i>p</i>	<i>p</i>	<i>p, ph</i>
<i>d</i>	<i>d</i>	<i>dh</i>
<i>t</i>	<i>t</i>	<i>t, th</i>
<i>ṭ</i>	<i>ṭ</i>	<i>d</i>
<i>ḏ</i>	<i>d</i>	<i>dh</i>
<i>θ</i>	<i>t</i>	<i>t, th</i>
<i>ṭ̣</i>	<i>ṭ</i>	<i>d</i>
<i>z</i>	<i>g</i>	<i>gh</i>
<i>ś</i>	<i>k</i>	<i>k, kh</i>
<i>ṣ</i>	<i>ḵ</i>	<i>g</i>
<i>s</i>	<i>s</i>	<i>s</i>
<i>š</i>	<i>s</i>	<i>s</i>
<i>g</i>	<i>g</i>	<i>gh</i>
<i>k</i>	<i>k</i>	<i>k, kh</i>
<i>ḵ</i>	<i>ḵ</i>	<i>g</i>

PS	Revised IE	Traditional IE
<i>g</i>	<i>G</i>	<i>g<sup>w</sup>h</i>
<i>k</i>	<i>q</i>	<i>k<sup>w</sup>, k<sup>v</sup>h</i>
<i>ḵ</i>	<i>q̣</i>	<i>g<sup>w</sup></i>
<i>ʕ</i>	<i>ʕ</i>	<i>H<sub>3</sub></i>
<i>x</i>	<i>x</i>	<i>H<sub>2</sub></i>
<i>ʕ</i>	<i>ʕ</i>	<i>H<sub>3</sub></i>
<i>ħ</i>	<i>ħ</i>	<i>H<sub>2</sub></i>
<i>ʔ</i>	<i>ʔ</i>	<i>H<sub>1</sub></i>
<i>h</i>	<i>h</i>	<i>H<sub>4</sub></i>
<i>y</i>	<i>y</i>	<i>y</i>
<i>w</i>	<i>w</i>	<i>w</i>
<i>m</i>	<i>m</i>	<i>m</i>
<i>n</i>	<i>n</i>	<i>n</i>
<i>l</i>	<i>l</i>	<i>l</i>
<i>r</i>	<i>r</i>	<i>r</i>
<i>ḏ</i>	<i>ʔ</i>	



2.8. PS *b* = IE *b* (*bh*):

- |   |   |
|---|---|
| A. PS * <i>bḱ</i> - "to cleave"<br>Hebr. <i>bāqaš</i> "to cleave"<br>Ar. <i>baqara</i> "to split open"                  | IE * <i>bḱ</i> - "to break" (* <i>bheg</i> -)<br>Skt. <i>bhanākti</i> "to break"                                |
| B. PS * <i>br</i> - "grain"<br>Hebr. <i>bār</i> , <i>bar</i> "grain"<br>Ar. <i>burr</i> "wheat"                         | IE * <i>br</i> - "grain" (* <i>bhares</i> -)<br>Lat. <i>far</i> "spelt, grain"                                  |
| C. PS * <i>br</i> - "son"<br>Aram. <i>bar</i> "son"   | IE * <i>br</i> - "son" (* <i>bher</i> -)<br>Lith. <i>bėrnas</i> "son"   |
| D. PS * <i>br</i> - "to cut, pierce"<br>Hebr. <i>bārāḏ</i> "to cut, carve",<br><i>bāraš</i> "to cut, pierce"            | IE * <i>br</i> - "to cut, pierce, bore" (* <i>bher</i> -)<br>OE. <i>borian</i> "to bore"                        |
| E. PS * <i>brḱ</i> - "to break, flash"<br>Hebr. <i>bāraq</i> "to break, flash<br>forth"<br>Ar. <i>baraqa</i> "to flash" | IE * <i>brḱ</i> - "to break, crack" (* <i>bhreg</i> -)<br>OE. <i>brecan</i> "to break"                          |
| F. PS * <i>b</i> - "in, at, on, with"<br><br>Hebr. <i>bə</i> - "in, within, among"<br>Ar. <i>bi</i> "in, at, on, with"  | IE * <i>b</i> - "in, at, on, with" used as a case<br>ending (*- <i>bhi</i> )<br><br>Gk. case ending - <i>φι</i> |
| G. PS * <i>bdḱ</i> "to break through"<br>Hebr. <i>bāḏaq</i> "to break<br>through"                                       | IE * <i>bd</i> - "to dig" (* <i>bhedh</i> -)<br>Lith. <i>bedù</i> "to dig"                                      |
| H. PS * <i>bh</i> - "to shine"<br>Hebr. <i>bāhaṭ</i> "to shine"<br>Ar. <i>bahara</i> "to glitter, shine"                | IE * <i>bh</i> - "to shine" (* <i>bhā</i> -)<br>Skt. <i>bhāti</i> "to shine"                                    |
| I. PS * <i>bnṭ</i> "to bind"<br>Hebr. <i>bānaṭ</i> "to bind"  | IE * <i>bnd</i> - "to bind" (* <i>bhendh</i> -)<br>Goth. <i>bindan</i> "to bind"                                |
| J. PS * <i>br</i> - "pure, clean"<br>Hebr. <i>bar</i> "pure, clean", <i>bārar</i><br>"to be clean"                      | IE * <i>br</i> - "shining, bright" (* <i>bher</i> -)<br>OE. <i>brūn</i> "brown"                                 |
| K. PS * <i>blg</i> "to shine"<br>Hebr. <i>bālay</i> "to make bright"<br>Ar. <i>balaja</i> "to shine"                    | IE * <i>bl</i> - "shining" (* <i>bhel</i> -)<br>Lith. <i>bālas</i> "white"                                      |
| L. PS * <i>ʔrb</i> "to be skillful"<br>Ar. <i>ʔariba</i> "to be skillful"   | IE * <i>ʔrb</i> - "to work" (* <i>orbho</i> -)<br>Goth. <i>arbaiþs</i> "work"                                   |

- M. PS *\*b<sub>w</sub>* "to live, reside"  
 Hebr. *bō* "to enter, come, arrive"  
 Ar. *bā* "to come back, return, reside, live, settle down"
- N. PS *\*bly* "to become worn out"  
 Hebr. *bālāh* "to be worn out"  
 Ar. *baliya* "to become worn"
- O. PS *\*br-* "to stand out, project"  
 Hebr. *bərōš* "cypress, pine"  
 Ar. *baraza* "to stand out, jut out, protrude"
- 2.9. PS *p* = IE *p* (*p*, *p<sub>h</sub>*):
- A. PS *\*pt<sub>h</sub>* "to open"  
 Hebr. *pāṭaḥ* "to open"  
 Ar. *fataḥa* "to open"
- B. PS *\*p<sub>h</sub>m* "to glow, be hot"  
 Hebr. *pāḥam* "to glow, be hot",  
*peḥām* "coal"  
 Ar. *faḥuma* "to char, make black", *faḥm* "charcoal"
- C. PS *\*pr-* "heifer, calf"  
 Hebr. *par* "bull, bullock",  
*pārāh* "heifer, young cow"  
 Ar. *farqad* "calf"
- D. PS *\*pl-* "even, level"  
 Hebr. *pālas* "to be even, level"  
 Akk. *palku* "wide"
- E. PS *\*pl-* "to split, cleave"  
 Hebr. *pālay* "to cleave", *pālam*  
 "to rend, cleave"  
 Ar. *falaqa* "to split, cleave"
- F. PS *\*pr-* "to spread, scatter"  
 Hebr. *pāraš* "to scatter"  
 Ar. *faraša* "to spread out"
- G. PS *\*pr-* "to bear, carry"  
 Hebr. *pārāh* "to bear, carry"
- IE *\*b<sub>w</sub>-* "to become, be" (*\*b<sub>h</sub>eu-*)  
 Skt. *bhāvati* "to become, be, exist, live, stay, abide"
- IE *\*bl-* "to become weak" (*\*b<sub>h</sub>lēu-*)  
 OE. *blēat* "miserable"
- IE *\*br-* "to bristle" (*\*b<sub>h</sub>ar-*)  
 OIce. *barr* "pine-needles"
- IE *\*pt-* "to spread, open" (*\*pet-*, *\*petə-*)  
 Lat. *pateō* "to be open"
- IE *\*p<sub>h</sub>w-* "fire" (*\*pāwer*)  
 Hitt. *pa-aḫ-hur* "fire"  
 Toch. A *por* "fire"  
 Gk. *πῦρ* "fire"
- IE *\*pr-* "heifer, calf" (*\*per-*)  
 Skt. *pṛithuka-s* "young animal"  
 Gk. *πόρις* "heifer, calf"  
 OE. *fearr* "bull"
- IE *\*pl-* "flat, level" (*\*pelə-*, *\*plā-*)  
 Gk. *πλατύς* "flat, level"
- IE *\*pl-* "to split, cleave" (*\*[s]p[h]el-*)  
 Skt. *phālati* "to burst, split, cleave"
- IE *\*prk-* "to scatter" (*\*[s]p[h]ereg-*)  
 Lat. *spargō* "to scatter, strew"
- IE *\*pr-* "to bear, carry" (*\*per-*)  
 Lat. *pariō* "to bear, bring forth"

- H. PS *\*p̥am* "to fill the mouth with food"  
 Hebr. *pālam* "to fill the mouth with food"  
 Ar. *faḷama* "to take food"
- I. PS *\*pr̥t* "to precede"  
 Ar. *faraṭa* "to precede"
- J. PS *\*h̥p̥s* "to flow forth"  
 Hebr. *hāḫas* "to flow forth"
- 2.10. PS *d* = IE *d* (*dh*):
- A. PS *\*drg* "to step, tread"  
 Hebr. *dāray* "to step, tread"  
 Ar. *daraja* "to go, walk"
- B. PS *\*drz* "to sew, stitch" (< *\*drg*)  
 Ar. *daraza* "to sew, stitch"
- C. PS *\*db-* "to stick together"  
 Bib. Aram. *dāḫaḫ* "to stick together, join"  
 Hebr. *dāḫal* "to press together"  
 Ar. *dabiqa* "to stick, adhere"
- D. PS *\*dl-* "to swing"  
 Hebr. *dālāh* "to swing", *dālāl* "to move to and fro"  
 Ar. *daldala* "to set into a swinging motion"
- 2.11. PS *t* = IE *t* (*t*, *th*):
- A. PS *\*tr̥p* "to have enough"  
 Hebr. *tāraḫ* "to nourish, delight"  
 Ar. *tarifa* "to live in luxury"
- B. PS *\*tr-* "to shake"  
 Ar. *tartara* "to shake violently"
- C. PS *\*tl-* "to lift, hang"  
 Hebr. *tālāl* "to raise up", *tālāḷ*, *tālāh* "to hang, suspend"
- IE *\*p̥d-* "to drink, swallow" (*\*p̥d̥[i]-*)  
 Skt. *pāti* "to drink, swallow"  
 Hitt. *pa-a-aš-zi* "to drink, swallow"
- IE *\*pr-* "preceding" (*\*per-*)  
 Lat. *primus* "first"
- IE *\*h̥p-* "to flow" (*\*ap-*)  
 Pal. *ha-a-ap-na-aš* "flood"
- IE *\*drg-* "to run" (*\*dhregh-*)  
 Gk. *τρέχω* "to run"
- IE *\*drg-* "to twist, turn" (*\*dheregh-*)  
 Arm. *dārnām* "to turn"  
 NPers. *darz*, *darza* "seam"
- IE *\*db-* "to join together" (*\*dhabh-*)  
 Lat. *faber* "skillful"
- IE *\*dl-* "to shake, vibrate" (*\*dhel-*)  
 Arm. *dolām* "to shake"
- IE *\*tr̥p-* "to have enough, be satiated" (*\*ter̥p-*, *\*tre̥p-*)  
 Skt. *tīṇyati* "to become satiated"  
 Gr. *τέρω* "to delight, please"
- IE *\*tr-* "to shake, tremble" (*\*trem-*; *\*tres-*, *\*ters-*)  
 Gr. *τρέω*, *τρέμω* "to tremble"
- IE *\*tl-* "to lift, weigh" (*\*tel-*)  
 Lat. *tollō* "to lift, raise"



- D. PS *\*t-* "this"  
Ar. *tī, tā* "this"  
Eg. *tn* "this"
- E. PS *\*tn-* "to stretch, extend"  
Hebr. *tānāh, tānan* "to spread, extend", *tānaχ* "to stretch"
- F. PS *\*tn-* "to utter a sound"  
Hebr. *tānan* "to utter a sound, cry"
- G. PS *\*trñ-* "to journey, travel"  
Hebr. *tārañ* "to journey, travel"
- H. PS *\*trb-* "to become dusty"  
Ar. *tariba* "to become dusty", *turba* "dust, earth"
- IE *\*t-* "this, that" (*\*to-*)  
Skt. *tād* "this, that"  
Gr. *τό* "this, that"
- IE *\*tn-* "to stretch" (*\*ten-*)  
Lat. *tendō* "to stretch, extend"  
Goth. *peihs* "time" (< *\*ténko-s*)
- IE *\*tn-* "to make a loud noise" (*\*[s]ten-*)  
Skt. *tányati* "to resound, roar"
- IE *\*trñ-* "to cross over, pass through" (*\*ter-, \*terə-*)  
Skt. *tārati* "to cross over, surpass, overcome"
- IE *\*trs-* "to become dry" (*\*ters-*)  
Gk. *τέρσομαι* "to become dry"  
Lat. *terra* "earth, ground"

2.12. PS *t* = IE *t̥* (*d*):

- A. PS *\*t̥ll-* "to drip"  
Hebr. *ṭālāl* "to flow (in tears)"  
Ar. *ṭalla* "to bedew"
- B. PS *\*trñ-* "to labor, tire"  
Hebr. *ṭārañ* "to labor, tire"
- C. PS *\*t̥ll-* "to overshadow, cover"  
Hebr. *ṭālāl* "to overshadow, cover"
- D. PS *\*t̥hr-* "to burn"  
Hebr. *ṭāḥar* "to burn, inflame"
- IE *\*t̥l-* "to drip" (*\*del-*)  
Mlr. *delt* "dew"  
Arm. *tel* "heavy rain"
- IE *\*trñ-* "to work" (*\*derə-, \*drā-*)  
Gk. *δράω* "to do, perform"
- IE *\*t̥l-* "to cover" (*\*del-*)  
OE. *teld* "tent"
- IE *\*t̥hw-* "to burn" (*\*dāu-, \*dau-*)  
Gk. *δαίω* "to kindle, burn"

2.13. PS *ḍ* (< *d*) = IE *d* (*dh*):

- A. PS *\*ḍr-* "to defecate"  
Hebr. *zārāh* "something loathsome"  
Ar. *ḍaraqa* "to drop excrement (bird)"
- B. PS *\*ḍrp-* "to flow forth"  
Hebr. *zāraφ* "to flow, pour"  
Ar. *ḍarafa* "to flow"
- IE *\*dr-* "to defecate" (*\*dher-*)  
Lat. *foria* "diarrhea"
- IE *\*dr-* "to gush forth" (*\*dher-*)  
Skt. *dhārā* "flood, gush"

- C. PS \**ǵrn* "protection, shelter" IE \**ǵr-* "to hold firmly, support, preserve" (\**dher-*)  
 Ar. *ǵaran* "protection, shelter" Skt. *dhāráyati* "to hold, bear, preserve, keep"
- D. PS \**ǵw-* "to scatter" IE \**ǵw-* "to scatter, disperse" (\**dheu-, \*dhewə-*)  
 Ar. *ǵāṣa* "to spread out, disseminate", *ǵāda* "to scatter, drive away" Skt. *dhūnóti* "to shake"  
 Lith. *dūmti* "to blow", *dūja* "dust"
- E. PS \**ǵbh* "to kill, slaughter" IE \**ǵb-* "to harm, injure" (\**dhebh-*)  
 Hebr. *zāḇaḥ* "to slaughter" Skt. *dabhnóti* "to hurt, injure"  
 Ar. *ǵabaḥa* "to kill, slaughter"
- F. PS \**ǵw-* "to waste away, exhaust" IE \**ǵw-* "to pass away, vanish" (\**dheu-*)  
 Ar. *ǵāba* "to dissolve, melt, waste away, exhaust, use up", *ǵawā* "to wilt, wither, fade" Goth. *daups* "death"

2.14. PS *θ* (< *t*) = IE *t* (*t*, *th*):

- A. PS \**θwr* "bull, steer" IE \**twr-* "bull" (\**tauro-s*)  
 Hebr. *šōr* "bull, cow" Lat. *taurus* "bull"  
 Ar. *θaur* "bull, steer"
- B. PS \**θml* "to become drunk" IE \**tm-* "to be dizzy, stupefied" (\**tem-*)  
 Ar. *θamila* "to become drunk" Skt. *tāmyati* "to faint, be exhausted"

2.15. PS *θ* (< *t*) = IE *t* (*d*):

- A. PS \**θnn* "to think" IE \**tn-* "to think" (\**dens-*)  
 Ar. *zanna* "to think" Skt. *dāmsa-s* "marvelous power"
- B. PS \**θrr* "to cut, split" IE \**tr-* "to split" (\**der-*)  
 Ar. *zarra* "to cut, split" OE. *teran* "to tear"  
 Gk. *δέρω* "to skin, flay"
- C. PS \**θry* "to flow, flee" IE \**tr-* "to run, flee" (\**der-*)  
 Hebr. *šārāh* "to flow" Skt. *drāti* "to run, hasten"  
 Ar. *zarā* "to flow, flee"

2.16. PS *z* (< *g*) = IE *g* (*gh*):

- A. PS \**wz-* "to carry" (< \**wg-*) IE \**wg-* "to carry" (\**wegh-*)  
 Hebr. *wāzar* "to carry" Lat. *vehō* "to carry, convey"

- Ar. *wazara* "to carry", *wazana* "to weigh"      OE. *wegan* "to carry, weigh"
- B. PS \**zr-* "to grow"      IE \**gr-* "to grow" (\**gher-*)  
     Hebr. *zāraḥ* "to sprout"      OE. *grōwan* "to grow"  
     Ar. *zaraʕa* "to grow"      OHG. *graz* "shoot, sprig, sprout"  
     Eth. *zarḏa* "to sow"
- C. PS \**zrḥ-* "to shine forth"      IE \**gr-* "to shine" (\**gher-*)  
     Hebr. *zāraḥ* "to shine forth"      OIr. *grían* "sun"
- D. PS \**zrr-* "to bind, gird up"      IE \**gr-* "to gird, enclose" (\**gher-*)  
     Hebr. *zārar* "to bind, gird up"  
     Ar. *zarra* "to button up"      Gk. *χόρος* "enclosed place"
- E. PS \**brz-* "to stand out, protrude"      IE \**brg-* "to be prominent, high"  
     Ar. *baraza* "to come out, show, jut out, stand out, protrude, surpass", *bāriz* "protruding, raised, prominent"      Hitt. *pār-ku-uš* "high"  
     Skt. *brhānt-* "high, tall, great"
- F. PS \**ḥzn-* "to make sad, grieve"      IE \**ḥg-* "to grieve" (\**agh-*)  
     Ar. *ḥazana* "to make sad, sadden, grieve"  
     Har. *ḥuzni* "sadness"      Gk. *ἄχος* "pain, sorrow, grief"
- 2.17. PS *ś* (< *k*) = IE *k* (*k*, *kh*):
- A. PS \**śṣ-* "fishhook"      IE \**kḱ-* "hook" (\**keg-*)  
     Ar. *śiṣṣ* "fishhook"      OE. *haca* "bolt"
- B. PS \**śy-* "to turn gray, gray hair"      IE \**ky-* "gray-haired, old" (\**kei-*)  
     Hebr. *śēṣ* "gray hair, old age"      OE. *hār* "gray, hoary, old"  
     Ar. *śāba* "to turn white or gray (hair)", *śaiḅ* "gray hair",      Skt. *śi-ti-s* "white"  
     *śāxa* "to age"      OCS. *śěrŭ* "gray"
- C. PS \**śml-* "to enclose"      IE \**km-* "to enclose" (\**kem-*)  
     Hebr. *śāmal* "to cover, wrap"  
     Ar. *śamila* "to contain, enclose, enfold"      OFris. *hemme* "enclosed land"
- D. PS \**śn-* "to hang"      IE \**knk-* "to hang" (\**kenk-*)  
     Ar. *śanaqa* "to hang", *śankala* "to hook up", *śankal* "peg, hook"  
     Hitt. *ga-an-ki* "to hang"  
     OIce. *hanga* "to hang"

- E. PS \**srx* "to become a youth, mature"  
Ar. *šaraxa* "to become a youth, mature"
- F. PS \**šrr* "to harm, injure"  
Ar. *šarra* "to be bad, vicious, malicious", *šarr* "evil, harm, injury"
- G. PS \**šrp* "to burn"  
Hebr. *šāraḥ* "to burn"  
Akk. *šarāpu* "to burn"
- H. PS \**šrt* "to cut, make incisions"  
Hebr. *šaraṭ* "to cut, lacerate"  
Ar. *šaraṭa* "to make incisions, scratch"
- I. PS \**šrt* "to make an agreement"  
Ar. *šaraṭa* "to impose as a condition, make a contract, bet, wager", *šarṭ* "condition, clause, provision", *šarṭiya* "contract, agreement"
- 2.18. PS *ṣ* (< *ḥ*) = IE *ḥ* (*g*):
- A. PS \**ḥsr* "enclosed place"  
Hebr. *ḥāšer* "enclosed place"  
Ar. *ḥašr* "encirclement"
- B. PS \**šly* "to burn, kindle"  
Hebr. *šālāh* "to roast"  
Ar. *šalā* "to burn"
- C. PS \**bwš* "to flee"  
Ar. *bāša* "to flee"
- D. PS \**šll* "to roll"  
Hebr. *šālal* "to roll", *šālul* "something round"
- E. PS \**šnn* "to be pointed"  
Hebr. *šānan* "to be pointed"
- F. PS \**šnp* "to make into a ball"  
Hebr. *šānaḥ* "to roll together", *šnēḥaḥ* "ball"
- IE \**kr-* "to grow, mature" (\**ker-*)  
Gk. *κόρος* "boy, son"
- IE \**kr-* "to harm, injure" (\**ker-*)  
Gk. *κερατίζω* "to destroy, plunder, kill", *κῆρ* "death, destruction"
- IE \**kr-* "to burn" (\**ker-*)  
OE. *heorð* "hearth"  
Lith. *kārštas* "hot"
- IE \**kr̥t-* "to cut, carve" (\**kerd-*)  
OIr. *cerd* "art, craft"
- IE \**kr̥t-* "agreement, contract" (\**kred-*)  
Skt. *śrat-karoti* "to make secure, guarantee", *śrad-dadhāti* "to believe, be trustful"  
Lat. *crēdō* "to trust, entrust"
- IE \**ḥkr-* "field" (\**agro-s*)  
Gk. *ἀγρός* "field"
- IE \**ḥl-* "bright, pure, clean" (\**gel-*, \**gelə-*)  
OHG. *kleini* "shining"
- IE \**bwk-* "to flee" (\**bheug-*)  
Gk. *φεύγω* "to flee"
- IE \**ḥl-* "to form into a ball" (\**gel-*)  
Lat. *globus* "ball, sphere"
- IE \**ḥn-* "jawbone, chin" (\**genu-*)  
Gk. *γένυς* "jaw"
- IE \**ḥn-* "to compress into a ball"  
OE. *cnotta* "knot"

2.19. PS *s* = IE *s* (*s*):

- |  |  |
|--|--|
| A. PS * <i>sgl</i> "to hold, get"<br>Hebr. <i>sāyal</i> "to hold fast, get,<br>acquire"    | IE * <i>sg-</i> "to hold" (* <i>segh-</i> )<br>Gk. <i>ἔχω</i> "to have, hold"  |
| B. PS * <i>skk</i> "to cut"<br>Hebr. <i>sāxaχ</i> "to cut"                                 | IE * <i>sk-</i> "to cut" (* <i>sek-</i> )<br>Lat. <i>secō</i> "to cut"   |
| C. PS * <i>sld</i> "to leap up"<br>Hebr. <i>sālað</i> "to leap up"                         | IE * <i>sl-</i> "to spring, leap" (* <i>sel-</i> )<br>Lat. <i>salīo</i> "to spring, leap, jump"                      |
| D. PS * <i>bsť</i> "to spread, spread out"<br>Ar. <i>basata</i> "to spread, spread<br>out" | IE * <i>bs-</i> "to scatter" (* <i>bhes-</i> )<br>Skt. <i>bhásman-</i> "ashes"<br>Gk. <i>ψύχω</i> "to breathe, blow" |

2.20. PS *š* = IE *s* (*s*):

- |   |  |
|---|--|
| A. PS * <i>šlm</i> "to be safe and sound"<br>Hebr. <i>šālam</i> , <i>šālēm</i> "to be safe<br>and sound"<br>Ar. <i>salima</i> "to be safe and<br>sound" | IE * <i>sl-</i> "whole, safe, uninjured" (* <i>sol-</i> )<br>Lat. <i>salvus</i> "safe, unhurt, well,<br>sound"   |
| B. PS * <i>šr-</i> "to creep, crawl, flow"<br>Hebr. <i>šāraš</i> "to creep, crawl<br>about"<br>Ar. <i>sariba</i> "to flow, creep"                       | IE * <i>sr-</i> "to creep, crawl, flow" (* <i>ser-</i> ,<br>* <i>serp-</i> , * <i>sreu-</i> )<br>Skt. <i>sárati</i> "to run, flow, move",<br><i>sárpati</i> "to creep, crawl", <i>srávati</i> ,<br>"to flow" |
| C. PS * <i>šll</i> "to remove"<br>Hebr. <i>šālal</i> "to pull out, strip,<br>plunder"<br>Ar. <i>salla</i> "to pull out, remove,<br>withdraw"            | IE * <i>sl-</i> "to take, seize" (* <i>sel-</i> )<br>Gk. <i>ἐλαίν</i> "to take, seize"   |
| D. PS * <i>nšp</i> "to breathe, blow"<br>Hebr. <i>nāšaφ</i> "to breathe, blow"<br>Ar. <i>nasafa</i> "to blow away"                                      | IE * <i>ns-</i> "nose" (* <i>nas-</i> )<br>Skt. <i>nasá</i> "nose"   |

2.21. PS *g* = IE *g* (*gh*):

- |   |  |
|---|--|
| A. PS * <i>gb-</i> "highest point, top"<br>Hebr. <i>gaß</i> "ridge, top", <i>gāḇaḥ</i><br>"to be high"<br>Ar. <i>jabīn</i> , <i>jabha</i> "brow, fore-<br>head" | IE * <i>gb-</i> "gable, head" (* <i>ghebh-el-</i> )<br>Gk. <i>κεφαλή</i> "head, front, end, point"<br>Goth. <i>gibla</i> "gable, pinnacle" |
|---|--|

- B. PS *\*grb* "to scratch, scrape" IE *\*grb-* "to scratch, scrape" (*\*ghrebh-*)  
 Hebr. *gāraβ* "to scratch, scrape"  
 Ar. *jarab* "itch, scabies" SCr. *grèbsti* "to scratch"
- C. PS *\*gdd* "to join together" IE *\*gd-* "to join, unite" (*\*ghedh-*)  
 Hebr. *gāḏaḏ* "to bind together, combine" OFris. *gadia* "to unite"
- D. PS *\*grp* "to seize, grasp" IE *\*gr-* "to grasp" (*\*gher-*)  
 Hebr. *gāraφ* "to seize, grasp" Skt. *hāratī* "to take"
- E. PS *\*gɔl* "to release, set free" IE *\*gɔ-* "to release" (*\*ghē[ɪ]-*)  
 Hebr. *gāɔal* "to release, set free" Skt. *jāhāti* "to leave, abandon"
- F. PS *\*gl-* "to freeze, be frozen" IE *\*gl-* "to be frozen" (*\*ghelad-*)  
 Ar. *jalida* "to be frozen, freeze", *jalid* "ice" Hom. *χάλαζα* "hail"  
 Ug. *glθ* "ice" OCS. *žlědica* "frozen rain"
- G. PS *\*gšš* "to touch, feel, handle" IE *\*gs-* "to handle; hand" (*\*ghesr-, \*ghesto-s*)  
 Hebr. *gāšaš* "to touch, feel" Hitt. *ki-eš-sar* "hand"  
 Ar. *jassa* "to touch, feel, handle" Skt. *hāsta-s* "hand"

2.22. PS *k* = IE *k* (*k*, *kh*):

- A. PS *\*ɔkl* "to eat" IE *\*ɔk-* "to eat" (*\*ek-*)  
 Hebr. *ɔāχal* "to eat" Skt. *aśnāti* "to eat"  
 Ar. *ɔakala* "to eat"
- B. PS *\*k-* "as, like, so, thus" IE *\*k-* "as, like" (*\*kai*)  
 Hebr. *kə-* "as like" Gk. *καί* "and, also, even, though"  
 Ar. *ka* "as, like" Lith. *kai* "when, as"  
 Eg. *kɔ* "so, then"
- C. PS *\*ks-* "to cut, clip" IE *\*ks-* "to cut" (*\*kes-*)  
 Hebr. *kāsaḥ* "to cut" Skt. *śāsati* "to cut"  
 Ar. *kasafa* "to cut, clip"
- D. PS *\*kl-* "to call" IE *\*kl-* "to call, cry out" (*\*kel-*)  
 Eth. *kalḥa* "to call someone by shouting" Gk. *καλέω* "to call"

- E. PS *\*km-* "to cover, hide"  
Hebr. *kāman* "to hide"  
Ar. *kamma*, *kamana* "to cover, conceal, hide"
- F. PS *\*krt* "to cut off, cut down"  
Hebr. *kāraθ* "to cut off, hew down"
- G. PS *\*kl-* "to guard, watch"  
Hebr. *kālāḏ*, *kālāh* "to hold, contain, keep back"  
Ar. *kalaḏa* "to guard, watch, protect, preserve"
- H. PS *\*klm* "to wound"  
Hebr. *kālam* "to wound"  
Ar. *kalm* "wound, cut, slash"
- IE *\*km-* "to cover" (*\*kem-*)  
Lat. *camisia* "shirt"
- IE *\*kr-* "to cut off" (*\*[s]ker-*)  
Gk. *κείρω* "to cut off, clip, hew down"
- IE *\*kl-* "to guard, watch, hold" (*\*kel-*)  
Goth. *haldan* "to hold, take care of, tend"
- IE *\*kl-* "to injure" (*\*kel-*)  
Lat. *clādēs* "disaster, injury"

2.23. PS *k̥* = IE *k̥* (*g*):

- A. PS *\*h̥k̥-* "to decree, command"  
Hebr. *h̥āq̣aq̣* "to ordain laws, decree"  
Ar. *h̥aqqa* "to put into action, enforce"
- B. PS *\*k̥mt̥* "to bind together"  
Hebr. *q̣amaṭ̥* "to bind together"  
Ar. *q̣amaṭa* "to fetter, shackle"
- C. PS *\*kr̥ḏ* "to call, cry out"  
Hebr. *q̣ārāḏ* "to cry, call out"  
Ug. *qr̥ā* "to call"
- D. PS *\*k̥wš̥* "to be bent, curved"  
Hebr. *q̣ūš̥* "to be crooked, bent"  
Ar. *q̣awisa* "to bend, be bent"
- E. PS *\*ky̥ḏ* "to crack, burst"  
Ar. *q̣āḏa* "to get broken, crack, split, burst"
- IE *\*h̥k̥-* "to direct, command" (*\*ag-*)  
Gk. *ἄγω* "to lead, conduct, guide, direct, command, rule, instruct"
- IE *\*km-* "to join together" (*\*gem-*)  
Gk. *γαμέω* "to marry"
- IE *\*kr-* "to cry hoarsely" (*\*ger-*)  
Skt. *jārate* "to roar, call, invoke"
- IE *\*kw-* "to bend, curve" (*\*geu-*)  
Gk. *γῦρός* "round, curved"
- IE *\*ky-* "to split open" (*\*gei-*)  
OE. *cīnan* "to crack"

2.24. PS *g* = IE *G* (*g<sup>w</sup>h*):

- PS *\*gny* "to harm"  
Ar. *janā* "to commit a crime, harm, inflict"
- IE *\*Gn-* "to strike, hurt" (*\*g<sup>w</sup>hen-*)  
Hitt. *ku-en-zi* "to strike, kill"  
Skt. *hānti* "to smite, slay, kill, wound, hurt"



2.25. PS *k* = IE *q* (*k<sup>w</sup>*, *k<sup>w</sup>h*):

PS \**kry* "to buy, rent, hire"  
 Hebr. *kārāh* "to buy"  
 Ar. *kariya* "to rent, hire"

IE \**qry-* "to buy" (\**k<sup>w</sup>rei-*)  
 Skt. *krīṇāti* "to buy, purchase"  
 Gk. *πρίαμαι* "to buy, rent"

2.26. PS *k̥* = IE *q̥* (*g<sup>w</sup>*):

A. PS \**k̥yñ* "to fester, be purulent"  
 Ar. *qāḥa* "to fester, be purulent"

IE \**q̥y-* "slime, filth" (\**g<sup>w</sup>ei-*)  
 Gk. *δείσα* "slime, filth"

B. PS \**k̥rθ* "to praise"  
 Ar. *qaraḥa* "to praise, laud, commend"

IE \**q̥r-* "to praise" (\**g<sup>w</sup>er[ə]-*)  
 Skt. *grṇāti* "to praise, extol"

2.27. PS *γ* = IE *γ* (*H<sub>3</sub>*):

PS \**myt̥* "to stretch, extend"  
 Hebr. *māṣaṭ* "to be slender, thin, small"  
 Ar. *mayafa* "to stretch, extend, draw out"

IE \**my-* "measure" (\**mē-*)  
 Skt. *māti* "to measure"  
 Hitt. *me-ḫur* "time"

2.28. PS *x* = IE *x* (*H<sub>2</sub>*):

A. PS \**xnk* "to be narrow, choke"  
 Hebr. *ḥānaq* "to be narrow, strangle"  
 Ar. *xanaqa* "to choke, strangle"

IE \**xng-* "to be narrow, strangle" (\**angh-*)  
 Skt. *amhū-s* "narrow"  
 Gk. *ᾄγχω* "to strangle"

B. Eg. *ḥnt* "face, front part; in front of", *ḥntw* (adv.) "before"

IE \**xnt-* "front; in front of, before" (\**anti*)  
 Skt. *ānti* "before"  
 Hitt. *ḫa-an-ti* "in front of, before"

2.29. PS *ς* = IE *ς* (*H<sub>3</sub>*):

PS \**śsr* "ten"  
 Hebr. *śeśer* "ten"  
 Ar. *śaśr* "ten"

IE \**śk-* "eight" (\**oktō[u]*)  
 Skt. *aṣṭā*, *aṣṭāu* "eight"  
 Gk. *ὀκτώ* "eight"

2.30. PS *ḥ* = IE *ḥ* (*H<sub>2</sub>*):

A. PS \**ḥmḏ* "to be sour"  
 Hebr. *ḥāmēš* "to be sharp, pungent, sour"  
 Ar. *ḥamuḏa* "to be sour"

IE \**ḥm-* "sour" (\**am-*, \**om-*)  
 Skt. *amlā-s* "sour, acid"

- B. PS *\*hnn* "to feel tenderness for" IE *\*hn-* "to feel well-disposed to, favorably inclined, kind, affectionate" (*\*ans-*)  
 Hebr. *hānan* "to incline towards, be gracious to"  
 Ar. *hanna* "to feel tenderness, affection, sympathy"
- C. PS *\*hr-* "to shine, glow, burn" IE *\*hrk-* "to shine, be bright; white" (*\*arg-*)  
 Hebr. *hārar* "to glow, burn", *hārēs* "to shine, glow", *hārēs* "to shine, glitter"  
 Ar. *harra* "to be hot", *haraqa* "to burn, kindle"
- D. PS *\*hrr* "to be noble, free" IE *\*hr-* "free-born, noble" (*\*aryo-*)  
 Hebr. *hārar* "to be noble, free"  
 Ar. *harra* "to be liberated, freed"  
 Skt. *ārya-s* "master, lord", *ārya-s* "a respectable or honorable person"  
 OIr. *aire* "nobleman"
- E. PS *\*hwk* "to weave" IE *\*hw-* "to weave" (*\*au-*, *\*awē-*)  
 Ar. *hāka* "to weave, braid, plait"  
 Lith. *āusti* "to weave"
- F. PS *\*hgb* "to cover, hide, conceal" IE *\*hg-* "to cover, obscure; dark cloud" (*\*aghlū-*)  
 Ar. *hajaba* "to cover, hide, conceal, obscure"  
 Gk. *ἀχλύς* "mist, gloom, darkness"

2.3I. PS  $\gamma$  = IE  $\gamma$  ( $H_1$ ):

- A. PS *\*γrθ* "earth, land" IE *\*γr-* "earth" (*\*er-*)  
 Hebr. *ṣeres* "earth"  
 Ar. *ṣarḍ* "earth, land"  
 Gk. *ἐρᾶ* "earth"  
 Goth. *airpa* "earth"
- B. PS *\*γwn* "to be at rest" IE *\*γwn-* "to be at rest" (*\*eunā*)  
 Ar. *ṣāna* "to be at rest", *ṣaun* "calmness, serenity"  
 Gk. *ἐννῆ* "the place where one beds down" (usually in reference to soldiers or animals)
- C. PS *\*mγy* "to become great" IE *\*mγ-* "to be great" (*\*mē-*, *\*mō-*)  
 Hebr. *māḡāh* "to become great"  
 OIr. *mār* "great"

- D. PS \**ǵn-* "to become ripe, mature" IE \**ǵn-* "year" (\**en-*)  
 Ar. *ǵanā* "to become ripe, mature", *ǵanan* "(span of) time, period"  
 Gk. *έτος* "year"

2.32. PS *h* = IE *h* (*H*<sub>4</sub>):

- A. PS \**h<sub>1</sub>p<sub>1</sub>k* "to turn back, about, away; overturn" IE \**h<sub>1</sub>p-* "(turned) away, back" (\**apo*)  
 Hebr. *hāpāx* "to turn; turn back, about, away; overturn"  
 Hitt. *a-ap-pa* "afterwards, back, again"  
 Ug. *h<sub>1</sub>p<sub>1</sub>k* "to overturn" Gk. *ἀπο, ἀπό* "off, away, back"  
 Skt. *āpa* "away, forth, back"
- B. PS \**hl-* "to shine" IE \**hl-* "to shine, be white" (\**albho-*)  
 Hebr. *hālāl* "to shine, be bright", *hālam* "to shine, sparkle"  
 Hitt. *al-pa-aš* "cloud"  
 Ar. *halla* "to shine, gleam, glow"  
 Lat. *albus* "white"

2.33. PS *y* = IE *y* (*y*):

- A. PS \**h<sub>2</sub>y-* "to live, be alive" IE \**h<sub>2</sub>y-* "to live, be alive" (\**aiw-*, \**ayu-*)  
 Hebr. *hāyāh* "to live, be, exist"  
 Skt. *āyú-s* "alive"  
 Ar. *hāyiya*, *hāyya* "to live" Gk. *αἰών* "lifetime, age"
- B. PS \**ǵy-* "which?" IE \**ǵy-* "which" (\**yo-*)  
 Ar. *ǵayy* "which?, what?" Skt. *yá-s* "which"
- C. PS \**ǵy-* "to come" IE \**ǵy-* "to go" (\**ei-*)  
 Ar. *ǵāna* "to come, approach"  
 Gk. *εἶμι* "to go"  
 Eg. *yy* "to come"
- D. PS \**yǵš* "to despair, give up or forsake something" IE \**yǵ-* "to release, let go" (\**yē-*)  
 Hebr. *yāǵaš* "to despair, give up or forsake something"  
 Gk. *ἵημι* "to release, let go, send off",  
 Ar. *yaǵisa* "to renounce, forgo"

2.34. PS *w* = IE *w* (*w*):

- A. Eg. *wy* "I" IE \**wy-* "we" (\**wei-*)  
 Hitt. *ú-(i-)e-eš* "we"  
 Skt. *vayám* "we"  
 Goth. *weis* "we"  
 Luw. 1 sg. ending *-wi*

- B. PS \**ǵw-* "or"  
Hebr. *ǵō* "or"  
Ar. *ǵau* "or"  
IE \**ǵw-* "or" (\**-we*)  
Skt. *-vā* "or"  
Lat. *-vĕ* "or"
- C. PS \**wdy* "to kill, destroy"  
Ar. *wadā* "to kill, destroy"  
IE \**wd-* "to slay, kill" (\**wedh-*)  
Skt. *vadhati* "to strike, kill, slay, destroy"
- D. PS \**twl* "to lengthen, grow long"  
Ar. *ṭāla* "to become long"  
IE \**tw-* "to lengthen, make long" (\**deu-*, \**dewə-*, \**dwā-*, \**dū-*)  
Skt. *dū-rá-s* "far, distant"  
Gk. *δῆν* (adv.) "long"
- E. PS \**wai* "woe!, shame!"  
Ar. *wai* "woe!, shame!"  
Har. *wāy* "woe!, misery!"  
IE \**wai* "woe!" (\**wai*)  
Lat. *vae* "alas!, woe!"
- 2.35. PS *m* = IE *m* (*m*):
- A. PS \**m̥dy* "middle"  
Hebr. *māḏāh* "middle"  
IE \**m̥dy-* "middle" (\**medhyo-*)  
Skt. *mādhya-s* "middle"
- B. PS \**ml-* "to wear out"  
Hebr. *mālaḥ* "to wear out, decay"  
Ar. *malla* "to become tired"  
IE \**ml-* "to wear away" (\**mel-*)  
Lat. *molō* "to grind"
- C. PS \**mn̥s* "to detain, keep back"  
Hebr. *mānaš* "to keep back, withhold"  
Ar. *manaša* "to stop, detain"  
Eg. *mn* "to remain"  
IE \**mn-* "to stay, remain" (\**men-*)  
Gk. *μένω* "to stay, remain"  
Lat. *maneō* "to stay, remain"
- D. PS \**mr̥* "to be manly; man; virile"  
Ar. *maruḏa* "to be manly",  
*marīḏ* "manly, virile"  
Ug. *mrī* "master"  
IE \**mr-* "young man" (\**meryo-*)  
Skt. *mārya-s* "young man"  
Gk. *μῆραξ* "lad"
- E. PS \**mā* "not"  
Ar. *mā* "not"  
IE \**m-* "not" (\**mē*)  
Gk. *μή* "not"
- F. PS \**ml̥* "to fill, make full, be filled"  
Hebr. *mālēḏ* "to fill, make full, be full"  
Ar. *malaḏa* "to fill, become filled, be full"  
IE \**ml-* "to be filled up" (\**mel-*)  
Lat. *multus* "many"

- G. PS *\*mr̥* "to be sick" IE *\*mr-* "to die" (*\*mer-*)  
 Ar. *marīḏa* "to be sick, fall ill" Skt. *mārate* "to die"  
 Ug. *mr̥* "to be sick"
- H. PS *\*mt̥* "to expand, stretch" IE *\*mt̥-* "to measure" (*\*med-*)  
 Hebr. *mutteḥ* "a stretching" Goth. *mitan* "to measure"  
 Ar. *maṭṭa* "to expand, stretch, lengthen"
- 2.36. PS *n* = IE *n* (*n*):
- A. PS *\*ñny* "to bend, twist" IE *\*ñn-* "to bend" (*\*ank-*, *\*ang-*)  
 Hebr. *ḥānāh* "to bend, turn" Skt. *āñcati* "to bend, curve"  
 Ar. *ḥanā* "to bend, twist" Gk. *ἀγκών* "curve, bend, elbow"
- B. PS *\*nky* "to beat, strike, smite" IE *\*nk-* "to slay, smite" (*\*nek-*)  
 Hebr. *nāḫāh* "to beat, strike, smite" Lat. *necō* "to kill, slay"  
 Ar. *nakā* "to cause damage to, harm, hurt, injure"
- C. PS *\*ɲn-* "in, on, from, by" IE *\*ɲn-* "in" (*\*en-*)  
 Akk. *ina* "in, on, from, by" Lat. *in* "in, into"
- D. PS *\*ɲn-* "I, we" IE *\*ɲn-* "us" (*\*ne-*, *\*nō-*, *\*nēs-*, *\*nōs-*,  
 sg. pl. *\*us-*)  
 Hebr. *ʔānī* (*ʔā*)*naḥnū* Hitt. encl. *-na-aš* "us"  
*ʔānōḫī* Skt. du. *nau*, pl. *nas* "us"  
 Ar. *ʔanā* *naḥnu* Gk. du. *νώ* "us"  
 Eg. *ynk ynn* Lat. *nōs* "we, us"
- 2.37. PS *l* = IE *l* (*l*):
- A. PS *\*l̥k-* "to gather, collect" IE *\*l̥k-* "to gather" (*\*leg-*)  
 Hebr. *lāqaṭ* "to pick up, gather together" Gk. *λέγω* "to pick, gather; speak"  
 Ar. *laqaṭa* "to gather, pick up, collect", *laqina* "to gather, infer, teach, dictate" Lat. *legō* "to ordain, appoint"
- B. PS *\*lwθ* "to stain, tarnish, soil" IE *\*lw-* "to make dirty; dirt" (*\*leu-*,  
*\*lewə-*, *\*lā-*)  
 Ar. *lāṭha* "to stain, tarnish, soil" Gk. *λῦμα* "dirt (removed by washing), filth"

- C. PS *\*lw̥h* "to shine, gleam; show; appear" IE *\*lw̥k-* "to shine, be bright" (*\*lew̥k-*)  
 Ar. *lāḥa* "to appear, show, shine, come into sight" Gk. *λευκός* "bright, white", *λεύσσω* "to gaze, look at, behold, see"
- D. PS *\*bly* "to reach, arrive, ripen, mature" IE *\*bl-* "to bloom" (*\*bhel-*)  
 Ar. *balaya* "to reach, arrive, ripen, mature" Goth. *blōma* "flower"
- 2.38. PS *r* = IE *r* (*r*):
- A. PS *\*rk̥b* "to observe, control" IE *\*rk̥-* "to lead, rule, control" (*\*reg-*)  
 Ar. *raqaba* "to observe, watch, supervise, control" Lat. *regō* "to guide, direct"
- B. PS *\*rks* "to bind, fasten" IE *\*rk̥-* "to bind" (*\*rek̥-*)  
 Hebr. *rāḥas* "to bind, fasten" Skt. *raśanā* "rope, cord"
- C. PS *\*hr̥θ* "to plow" IE *\*hr̥-* "to plow" (*\*ar[ə]-*)  
 Hebr. *ḥāraš* "to plow" Hitt. *ḥar-aš-zi* "to plow"  
 Ar. *ḥaraṭha* "to plow" Lat. *arō* "to plow"
- D. PS *\*rx* "to go, travel" IE *\*r̥-* "to go, come, set in motion" (*\*er-*, *\*or-*)  
 Hebr. *ḥāraḥ* "to go, travel" Hitt. *a-ri* "to arrive, come"  
 Akk. *urxu* "road, way" Lat. *orior* "to arise"

2.39. In the examples cited, certain regular patterns appear to emerge concerning the structure of the root in Pre-Indo-European. It may be assumed that the Pre-Indo-European root was mainly, though not exclusively (cf. SCHMITT-BRANDT 1967: 8f.; SZEMERÉNYI 1972b: 143f.), biconsonantal. Further, it seems that a third element could be added to this root to form a triconsonantal system. This system, though partially obscured by later phonological changes, seems to have prevailed for some time after the Pre-Indo-European period (cf. BENVENISTE 1935: 170f.).

In the Semitic languages, the overwhelming majority of roots are triconsonantal. However, it is probable that at one time there were more biconsonantal roots and that the triconsonantal system has been greatly expanded at the expense of roots with other than three consonants (for details cf. MOSCATI 1964: 72f.).

The fundamental meaning of an Indo-European root was attached to the consonants only. The vowels originally did not determine meaning but, rather, morphological function (cf. MEILLET 1964: 153f.). The

Semitic vowels also play a tremendous role in grammatical categorization, and the same may be said for the Egyptian vowels (cf. VERGOTE 1971: 43f.).

### 3. *Phonemic Stress Stage of Indo-European.*

#### 3.1. Stress Indo-European phonemic system:

##### A. Consonants:

<i>b</i>	<i>p</i>	<i>d</i>	<i>t</i>	<i>g</i>	<i>k</i>	<i>G</i>	<i>q</i>	<i>ʔ</i>
		<i>t̥</i>		<i>k̥</i>		<i>q̥</i>		
		<i>s</i>		<i>ɣ</i>	<i>x</i>			<i>h</i>

##### B. Vowels:

<i>a</i>	<i>i</i>	<i>u</i>
<i>a̰</i>	<i>ḭ</i>	<i>ṵ</i>

##### C. Resonants:

*y w m n l r*

#### 3.2. Phonemes:

- A. Consonants: always non-syllabic;
- B. Vowels: always syllabic;
- C. Resonants: syllabicity determined by surroundings: syllabic between any combination of consonants and non-syllabic in the neighborhood of vowels.

#### 3.3. Suprasegmentals:

- A. Stress: applied only to vowels; distribution correlated with grammatical categorization;
- B. Pitch: non-distinctive.

#### 3.4. Vowel Gradation (cf. BURROW 1973: 108f.; LEHMANN 1952: § 15.4):

The reduction and expulsion of a vocalic element is caused specifically by either a decrease or increase in the degree of intensity placed on different syllables. When one syllable of a word is stressed more than the other syllables, the vocalic elements of the unstressed syllables tend to be either weakened or lost. This is exactly what has happened in Early Latin, Proto-Germanic, Old Irish, Armenian, and Tocharian: that is to say, in all of the daughter Indo-European languages that have developed a system of accentuation based upon stress.

Indo-European proper began with the phonemicization of a strong stress accent. This accent caused the elimination of unaccented vowels. There was a phonemic contrast between those syllables with stress and those syllables without stress. Stress was used as an internal grammatical



morpheme, the stressed syllable being the morphologically important syllable.

It happened that in certain inflectional and derivational categories an initial syllable was considered to be morphologically important, while in other categories a medial or final syllable was considered to be important. Therefore, the same word could appear in any one of a number of different forms depending upon how it was used grammatically. A particular syllable might have been stressed at one time and unstressed at another.

The rules governing the position of the accent may be stated rather simply: 1) Neuter action nouns were accented on the stem in the strong cases but on the ending in the weak cases (cf. BURROW 1973: 220f.). 2) Common gender agent noun/adjectives were accented on the suffix throughout the paradigm (cf. BURROW 1973: 119). 3) Athematic verbs were accented on the stem in the singular but on the ending in the plural (and dual) in the indicative and on the ending throughout the middle (cf. BURROW 1973: 303).

The thematic formations require special comment. It seems that thematic agent noun/adjectives were originally accented on the ending in the strong cases and on the stem in the weak cases. This pattern is the exact opposite of what is found in the neuter action nouns. The original form of the nominative singular consisted of the accented thematic vowel alone. It is this ending that is still found in the vocative singular in the daughter languages and in relic forms such as *\*pénqe* (earlier *\*pnqé?*) "5". The nominative singular in *\*-os* is a later formation and is identical in origin with the genitive(-ablative) (cf. SZEMERÉNYI 1972b: 156). Toward the end of the Phonemic Pitch Stage of Indo-European, the accent was assigned a fixed position throughout the paradigm (cf. BURROW 1973: 255). Thematic verbal forms were later formations (cf. KERNS-SCHWARTZ 1968: 717f.) and were not affected by the stress accent.

The relationship between the position of the accent and quantitative vowel gradation is best preserved in the daughter languages in the conjugation of athematic verbs, Sanskrit being particularly conservative. In the indicative, the shift of accent from the stem in the singular to the ending in the plural is accompanied by a corresponding variation in vowel grade:

	Hittite	Sanskrit	Greek	Late IE
1 sg.	<i>e-eš-mi</i>	<i>ásmi</i>	<i>εἰμί</i>	<i>*ǵés-m-i</i>
2 sg.	<i>e-eš-ši</i>	<i>ási</i>	<i>εἶ, εἶς, ἐσσί</i>	<i>*ǵés-s-i</i>
3 sg.	<i>e-eš-zi</i>	<i>ásti</i>	<i>ἐστί/ἔστω</i>	<i>*ǵés-t-i</i>
1 pl.	<i>e-šu-wa-ni</i>	<i>smás(i)</i>	<i>ἐσμέν</i>	<i>*ǵs-mé</i>
2 pl.		<i>sthá</i>	<i>ἐστέ</i>	<i>*ǵs-té</i>
3 pl.	<i>a-ša-an-zi</i>	<i>sánti</i>	<i>εἰσὶ &lt; *έντι</i>	<i>*ǵs-én-t-i</i>

In the latest period of Indo-European, the quantitative gradation was no longer productive. Had there been a strong stress accent at this time, each Indo-European word could have had only one syllable with full-grade vowel, the vowels of the unstressed syllables having all been eliminated. However, since the majority of reconstructed Indo-European words have more than one full-grade vowel, the stress accent must have become non-distinctive at some point prior to the latest stage of Indo-European.

### 3.5. The Long Vowels:

The origin of the long vowels has always been enigmatic. Many theories have been proposed, but none has been completely satisfactory. One thing is certain, though: the long vowels developed over a long period of time and had many causes.

The most widely accepted theory explains the origin of the long vowels as a result of compensatory lengthening when the syllable standing directly after the stressed syllable lost its vocalic element (cf. LEHMANN 1952: § 15.4). However, PROKOSCH (1938: 125f.), following R. LOEWE, cautiously favors spontaneous lengthening, while SHEVELOV (1964: 116) supports KURYŁOWICZ's theory that length was morphologically conditioned and arose by analogy. SZEMERÉNYI (1970: 106f.), on the other hand, thinks that long vowels had a purely phonological origin.

On general theoretical and typological grounds, I think it probable that long vowels always existed. No doubt when Stress Indo-European began to assume its basic characteristics, long vowels were assigned to certain grammatical categories and short vowels to others.

The lengthened-grade was originally used to indicate the nominative singular in athematic agent noun/adjectives. This helped to differentiate between these forms and the oblique case (the later locative) of the neuter action nouns, which otherwise would have been identical. The lengthened-grade was later extended in this function to include all *r*-, *n*-, and *s*-stems. The lengthened-grade was also found in the nominative singular of root nouns (cf. BURROW 1973: 123).

In addition to those inherited from Pre-Indo-European, new long vowels arose from the contraction of two short vowels. Though probably not frequent in the earlier stages of development, contraction became increasingly important, especially in the later stages of the parent language and the early stages of the daughter languages when the upheavals that were caused by the loss of whole classes of phonemes often brought two or more previously separated vowels into contact.

Finally, vowels were lengthened to compensate for the loss of a following phoneme. The most significant cause of compensatory lengthening was the loss of pre-consonantal laryngeals after short vowels in Disintegrating Indo-European (cf. § 6.4).

### 3.6. Summary:

The Phonemic Stress Stage of Indo-European was thus characterized by a vowel system in which the normal-grade contrasted with the lengthened-grade on the one hand and with the zero-grade on the other. The normal-grade was found in all strongly stressed, morphologically important syllables except those that had lengthened-grade, while the zero-grade was found in all former syllables that had lost their vocalic element because they were morphologically non-distinctive and, therefore, unstressed.

### 3.7. The Vowels *i* and *u*:

In reconstructing the Indo-European phonemic system, the vowels *i* and *u* are usually treated as allophones of *y* and *w* respectively and are classed together with *m*, *n*, *l*, *r* (cf. MEILLET 1964: 105f.). However, the patterning of these sounds is not entirely parallel, and SZEMERÉNYI (1967: 82) is quite justified in questioning the validity of this treatment. Therefore, *i* and *u* should be considered as independent phonemes and should be classed with the vowels rather than with *m*, *n*, *l*, *r*.

The traditional treatment assumes that *i* and *u* result from the weakening of full-grade forms when the accent is shifted to another syllable (cf. BURROW 1973: 108f.). The patterning found in the daughter languages suggests such an interpretation, but that patterning may not be original in every case. It can be convincingly demonstrated in several cases that secondary full-grades have been created from weak-grade forms (cf. ANTILA 1969: 163f.). Both SCHMITT-BRANDT (1967: 8f.) and WYATT (1970: 58) assume that every *ei*, *eu*, and the like are secondarily derived, but, as SZEMERÉNYI (1972a: 170) points out, it is unlikely that such a gradation pattern would have developed were it not for a pre-existing pattern. Hence, though not universally applicable, secondary derivation of full-grade forms is certainly probable in a great number of cases.

The vowels *i* and *u* thus had two origins. First, they were independent phonemes inherited from Pre-Indo-European. Next, they developed from the stress conditioned weakening of full-grade forms.

It seems reasonable to assume that long *i* and *u* were also inherited from Pre-Indo-European. When secondary full-grades were created with long *i* and *u*, the result was the same as with short *i* and *u*. This is clear from the thematic optative, which is formed by contraction of the thematic vowel and the optative ending: *o* + *i*, cf. Gk. *φέποις*. This, in part, explains the origin of the short and long weak-grade variation.

Finally, SZEMERÉNYI (1972a: 169f.) expects that unaccented *i* and *u* would be lost. I must agree with SZEMERÉNYI that syncope of these vowels probably did occur in some cases. This, in part, is the essence of

his work *Syncope in Greek and Indo-European and the Nature of Indo-European Accent*. It should be kept in mind here, though, that Indo-European accentuation and vowel gradation were correlated with grammatical categorization, and, therefore, we would expect unaccented *i* and *u* to resist syncope when they were reduced grades in alternation with corresponding full-grades. Furthermore, when they were not in alternation, it seems that there was a tendency to bring them into line with the regular gradation series by the insertion of a full-grade vowel in the accented forms.

### 3.8. The Resonants:

The resonants could function as syllabics or non-syllabics depending upon their environment. They were non-syllabic 1) when between vowels or initially before vowels, 2) when preceded by a vowel and followed by a consonant, and 3) when preceded by a consonant and followed by a vowel.

The resonants became syllabic when the stress conditioned loss of former contiguous vowels left them between two non-syllabics:

$$CaR'Ca > C-R'Ca > CR'Ca$$

For a fuller discussion of the patterning of the resonants, cf. EDGERTON (1943: 83f. and 1962: 352f.), HOROWITZ (1974), LEHMANN (1952: § 2.2), and SZEMERÉNYI (1970: 100f. and 1972b: 148).

### 3.9. The Consonants:

The traditional reconstruction of the Indo-European consonant system includes 1) plain voiceless stops, 2) aspirated voiceless stops, 3) plain voiced stops, and 4) aspirated voiced stops (cf. MEILLET 1964: 82f.). However, as early as 1891, DE SAUSSURE claimed that the voiceless aspirates developed from the coalescence of the plain voiceless stops and a following voiceless laryngeal. Even though this theory does not account for all cases of voiceless aspirates (cf. BURROW 1973: 393; COLLINGE 1970: 75), it has become increasingly clear that these sounds were not phonemic in the parent language (cf. LEHMANN 1952: 80f.). Original voiceless aspirates seem to have been extremely rare and to have been purely non-phonemic allophones of the plain voiceless stops in Indo-European as in Proto-Kartvelian (cf. GAMKRELIDZE 1967: 709). DE SAUSSURE's theory accounts for the origin of some later additions.

The removal of the voiceless aspirates affects the status of the so-called "voiced aspirates" since a phonemic system with the contrast plain voiceless stop ~ plain voiced stop ~ aspirated voiced stop is without typological parallels (cf. JAKOBSON 1971: 528). Therefore, it becomes

necessary to redefine the phonetic make-up of the "voiced aspirates". It should be noted that several unsuccessful attempts have already been made in this direction. For example, the reinterpretation of this series as "emphatics" is not convincing because such sounds are notoriously prone to "color" contiguous vowels (cf. AL-ANI 1970: 23f. for comments about vowel "coloring" in Arabic). In Indo-European, all vowels are found in the neighborhood of the "voiced aspirates", and there is no indication that any of these vowels had different allophones here than when contiguous with other sounds. If the "voiced aspirates" had in fact been "emphatics", they would have changed contiguous vowels in some manner, and these changes would be reflected in the daughter languages. However, this is not the case. PROKOSCH's (1938: 39f.) interpretation of this series as voiceless fricatives cannot be right either because the majority of the daughter languages point to voiced pronunciation. The same objection may also be raised against the theory that the "voiced aspirates" were not phonemically voiced. Finally, the theory that the "voiced aspirates" were really voiced fricatives is equally unconvincing because the daughter languages point to stops rather than fricatives.

The reflexes found in the daughter languages either are plain voiced stops or are sounds that can easily be derived from plain voiced stops in the majority of cases (cf. MEILLET 1964: 86f. for correspondences and examples). Only Sanskrit, Greek, and Italic present problems. Now, since neither Avestan nor Old Persian have "voiced aspirates", the fact that such sounds exist in Sanskrit must be due to an Indo-Aryan innovation. Therefore, it is wrong to project the Sanskrit phonetic system back into Indo-European. As for Greek and Italic, it is necessary to assume that original plain voiced stops first became aspirated voiceless stops (cf. HOPPER 1973: §3.3.2).

A reinterpretation of the "voiced aspirates" as plain voiced stops then affects the status of the phonemes traditionally reconstructed as plain voiced stops. The reflexes found in the daughter languages leave no doubt that the two series were distinct in the parent language. HOPPER (1973: §3.1.3), basing his arguments mainly on typological considerations, reinterprets this series as glottalized stops. GAMKRELIDZE-IVANOV (1973: 150f.) arrive at a similar interpretation. HOPPER's system 1) eliminates the typological problems caused by the removal of the voiceless aspirates from the Indo-European phonemic system as traditionally reconstructed, 2) easily explains the rarity of *b* in Indo-European (cf. HOPPER 1973: §3.2.3), and 3) offers the first credible explanation of inadmissible Indo-European root structure sequences (cf. HOPPER 1973: §3.2.6). Moreover, by adopting HOPPER's system, it is possible for the first time to make a meaningful comparison between Indo-European and related and/or contiguous

languages such as Proto-Kartvelian and Proto-Semitic. Therefore, HOPPER's reinterpretation of the traditional plain voiced stops as glottalized stops has been adopted here.

A reconstruction of the Indo-European consonant system with the contrast plain voiceless stop ~ glottalized stop ~ plain voiced stop receives powerful support from Germanic and Armenian. These branches have traditionally been assumed to have undergone "consonant shifts". It now turns out that they are extremely conservative and that it is the other branches that have innovated.

Finally, I have adopted HOPPER's suggestion (personal correspondence) that Indo-European had a contrast between velars and (strongly labialized) post-velars.

3.10. Pre-IE  $x$  and  $\tilde{h}$  merge into  $x$ , and  $\gamma$  and  $\zeta$  merge into  $\gamma$ .

#### 4. *Phonemic Pitch Stage of Indo-European.*

##### 4.1. Pitch Indo-European phonemic system:

###### A. Consonants:

$b$	$p$	$d$	$t$	$g$	$k$	$G$	$q$	$\varphi$
		$\dot{t}$		$\dot{k}$		$\dot{q}$		
		$s$		$\gamma$	$x$			$h$

###### B. Vowels:

$a$	$i$	$u$
$a\cdot$	$i\cdot$	$u\cdot$

###### C. Resonants:

$y$   $w$   $m$   $n$   $l$   $r$

##### 4.2. Phonemes: unchanged (cf. § 3.2).

##### 4.3. Suprasegmentals:

###### A. Stress: non-distinctive;

###### B. Pitch: distribution morphologically conditioned; high pitch is applied to morphologically distinctive vowels, and low pitch is applied to morphologically non-distinctive vowels.

##### 4.4. Vowel Gradation (cf. BURROW 1973: 112f.; HIRT 1921: 172f.; LEHMANN 1952: § 15.3; SCHMITT-BRANDT 1967: 124f.):

It often happened that more than one syllable of a word was considered to be morphologically significant. For example, according to the rules of derivation and inflection, the initial syllable of a word

might have received the stress. At the same time, an inflectional ending might have been added, and this ending, in order not to be morphologically ambiguous, might also have had a full-grade vowel in addition to the one found in the stressed syllable. By the same token, when the shift of accent from, say, the stem to the ending would have produced unpronounceable consonant clusters, the vowel of the stem was retained.

It is probable that the Indo-European stress was pronounced with special intonations that helped make the accented syllable more discernible (cf. JONES 1967: § 427 and § 446). When words with more than one full-grade vowel came into being, stress ceased to be phonemically distinctive. High pitch became the suprasegmental characteristic of the full-grade syllable that would normally have received the stress according to the rules of derivation and inflection, while the remaining full-grade vowel received low pitch. Under high pitch, *a* and *a*· had front allophones, and under low pitch, they had back allophones. According to LEVIN (1971: 149f.), a similar phenomenon has taken place in Hebrew. For additional information on pitch conditioned allophonic variation in vowels, cf. JONES (1967: § 112, § 113, and §§ 543-47) and LEHISTE (1970: 68f., especially pp. 78-79).

#### 4.5. The Anatolian Languages:

Proto-Anatolian must be derived from Pitch Indo-European. It cannot be derived from either Late Indo-European or Disintegrating Indo-European because changes took place during these periods that are not found in the Anatolian languages:

- A. There is no evidence at all to my mind that Proto-Anatolian had *o*-grade vowels. In every instance where the evidence of the Non-Anatolian daughter languages points to an *o* in the parent language, the Anatolian languages have *a*. Therefore, the Anatolian languages must have become separated from the main speech community before the appearance of *o*-grade vowels. *o*-grade vowels became phonemic in Late Indo-European (cf. § 5.4).
- B. Another change that took place in Late Indo-European but that is not found in the Anatolian languages is the palatalization of velars when next to front vowels and apophonic *o* (cf. § 5.7).
- C. The Anatolian languages show no trace of laryngeal metathesis (cf. § 5.8).
- D. Finally, the Anatolian languages are isolated in preserving at least two reflexes of the laryngeals, namely *x* (written *ḫ* in Hittite) and *γ* (written *ḡ* in Hittite). The Non-Anatolian daughter languages show no trace of laryngeals either initially (except Armenian, cf. STURTEVANT 1942: § 22a) or medially.



However, the presence of former medial laryngeals is indicated by the lengthening of preceding vowels (cf. § 6.4).

For details about the above, cf. my forthcoming article "The Placing of the Anatolian Languages", *Orbis* XXV, number 2, December, 1976.

### 5. *Late Indo-European.*

#### 5.1. Late Indo-European phonemic system:

##### A. Consonants:

<i>b</i>	<i>p</i>	<i>d</i>	<i>t</i>	<i>g</i>	<i>k</i>	<i>G</i>	<i>q</i>	<i>ʔ</i>
		<i>ṭ</i>		<i>ḱ</i>		<i>ǵ</i>		
		<i>s</i>		<i>γ</i>	<i>x</i>			<i>h</i>

##### B. Vowels:

<i>e</i>	<i>o</i>	<i>a</i>	<i>i</i>	<i>u</i>
<i>e·</i>	<i>o·</i>	<i>a·</i>	<i>i·</i>	<i>u·</i>

##### C. Resonants:

*y w m n l r*

#### 5.2. Phonemes: unchanged (cf. § 3.2).

#### 5.3. Suprasegmentals:

##### A. Stress: non-distinctive;

##### B. Pitch: applied only to vowels; distribution partially correlated with vowel gradation.

#### 5.4. Vowel Gradation (cf. BURROW 1973: 112f.; HIRT 1921: 172f.; LEHMANN 1952 § 15.3; SCHMITT-BRANDT 1967: 124f.):

In Late Indo-European, the pitch conditioned allophones of *a* and *a·* became phonemic, and the system of accentuation based upon pitch became disrupted. The phonemicization of the front and back allophones probably came about when a morphologically conditioned rearrangement of pitch distribution caused the high pitch to fall on other than the front allophone and low pitch to fall on other than the back allophone. This pitch shift may be equated with the development of columnar accent, that is, the leveling out of the accent onto the same syllable within a paradigm. Contrasts that had formerly been indicated by differences in pitch came to be indicated by differences in vowel quality. The opposition of *a* with high pitch to *a* with low pitch became an opposition of *e* to *o*. Similarly, *e·* and *o·* developed from *a·* with high pitch and *a·* with low pitch respectively.

The development of qualitative gradation may be illustrated by positing a Stress Indo-European *\*diwá*, the nom.-acc.-voc. of a common gender thematic agent noun/adjective meaning “(one) connected with light or brilliance”, hence “god, divine”. The genitive was formed by adding the ending -s, and the fact that this was a weak case was indicated by moving the position of the accent to the first syllable (cf. § 3.4): *\*diwas*. Note that the vowel *a* was retained for clarity. Since the vowel *a* implied the presence of accent, when the accent fell on *i* or *u*, an *a* was inserted, thus creating a secondary full-grade (cf. § 3.7). The resulting form was *\*ddiwas*. High pitch replaced stress as the suprasegmental characteristic of morphologically important syllables. Under high pitch, *a* and *a*· developed front allophones, and under low pitch, they developed back allophones. These allophones gained phonemic value when a morphologically conditioned pitch shift caused them to become partially disassociated from pitch distribution: *\*diwas* > *\*ddi-wàs* > *\*dei-wós* (cf. Skt. nom. sg. *devá-s* “god”; Lith. *diēvas*).

#### 5.5. Effects of the Laryngeals:

It is currently held that the laryngeals *h* and *x* (KURYŁOWICZ's  $\mathfrak{z}_4$  and  $\mathfrak{z}_2$  respectively) changed a contiguous *e* to *a*. Rather, it would be better to say that, at the time of the phonemicization of the front and back allophones of *a* and *a*·, these laryngeals prevented a contiguous *a* from becoming *e*. In other words, when the allophones of *a* and *a*· became disassociated from pitch distribution, *e/e*· and *o/o*· became phonemic except that *á* and *á*· were not changed to *e* and *e*· respectively in the neighborhood of either *h* or *x*. These laryngeals had no effect on the change of *à* and *à*· to *o* and *o*· respectively, however.

I do not think that we should attempt to posit a contiguous laryngeal for every case of *a* in Late Indo-European. It seems logical to assume that in relic forms and in loanwords from other languages, *a* could be original. For example, the Indo-European word for “mother” has been reconstructed as *\*ma-tér-* (cf. POKORNY 1959: 700f.). It is ridiculous to derive the first syllable from an earlier *\*meA-* or the like. This and similar words clearly lie outside the regular vocabulary. Consequently, the initial syllable was probably always *\*ma-* (cf. SZEMERÉNYI 1967: 92, fn. 85).

It should be noted that while I do not consider the problem of non-apophonic *o* to be solved, I do not think that it arose from the “coloring” of a vowel by a contiguous laryngeal. Most likely, the appearance of non-apophonic *o* was a late feature.

#### 5.6. Decay of Vowel Gradation:

Concurrent with the morphologically conditioned development of the system of vowel gradation, another method of indicating grammat-

ical relationships was developing: the use of inflectional endings. Gradually, the use of endings became the primary means of distinguishing morphological categories with the result that vowel gradation became mostly an unnecessary and redundant feature. It was not long before the system of vowel gradation began to disintegrate as analogical leveling took place. Also, Late and Disintegrating Indo-European, as well as the daughter languages, continued to create new formations that, unlike older formations, were not affected by the causes of vowel gradation. Therefore, the patterns of vowel gradation are only imperfectly preserved in the last stage of the Indo-European parent language and in the daughter languages.

### 5.7. The Gutturals:

In Late Indo-European, *g*, *k*, and *ǵ* developed palatalized allophones when they were contiguous with front vowels and with apophonic *o* (cf. GEORGIEV 1966: 21f.; MEILLET 1964: 91f.; SZEMERÉNYI 1970: 137f.).

### 5.8. Laryngeal Metathesis:

According to WINTER (1965: 191f.), the sequences *Hu* and *Hi* became *uH* and *iH* respectively when followed by a non-syllabic. This metathesis accounts for the fact that the weak-grades of *eHu* and *eHi* are *u* and *i* respectively in Disintegrating Indo-European. Once the metathesis had taken place in the weak-grade forms, they served as the basis for new full-grade forms. A good example is the word for "fire", which has unmetathesized derivatives in Hittite, Tocharian A, and Gothic and metathesized derivatives elsewhere, except for OHG. *fiur*, which points to a Disintegrating IE *\*peuHri* with secondary full-grade.

## 6.1. Central Dialects of Disintegrating Indo-European:

### A. Consonants:

<i>b</i>	<i>p</i>	<i>d</i>	<i>t</i>	<i>ǵ</i>	<i>ć</i>	<i>g</i>	<i>k</i>
		<i>ṭ</i>		<i>č</i>		<i>ḱ</i>	
		<i>s</i>					
						<i>h</i>	[ <i>h</i> , <i>ḥ</i> ]

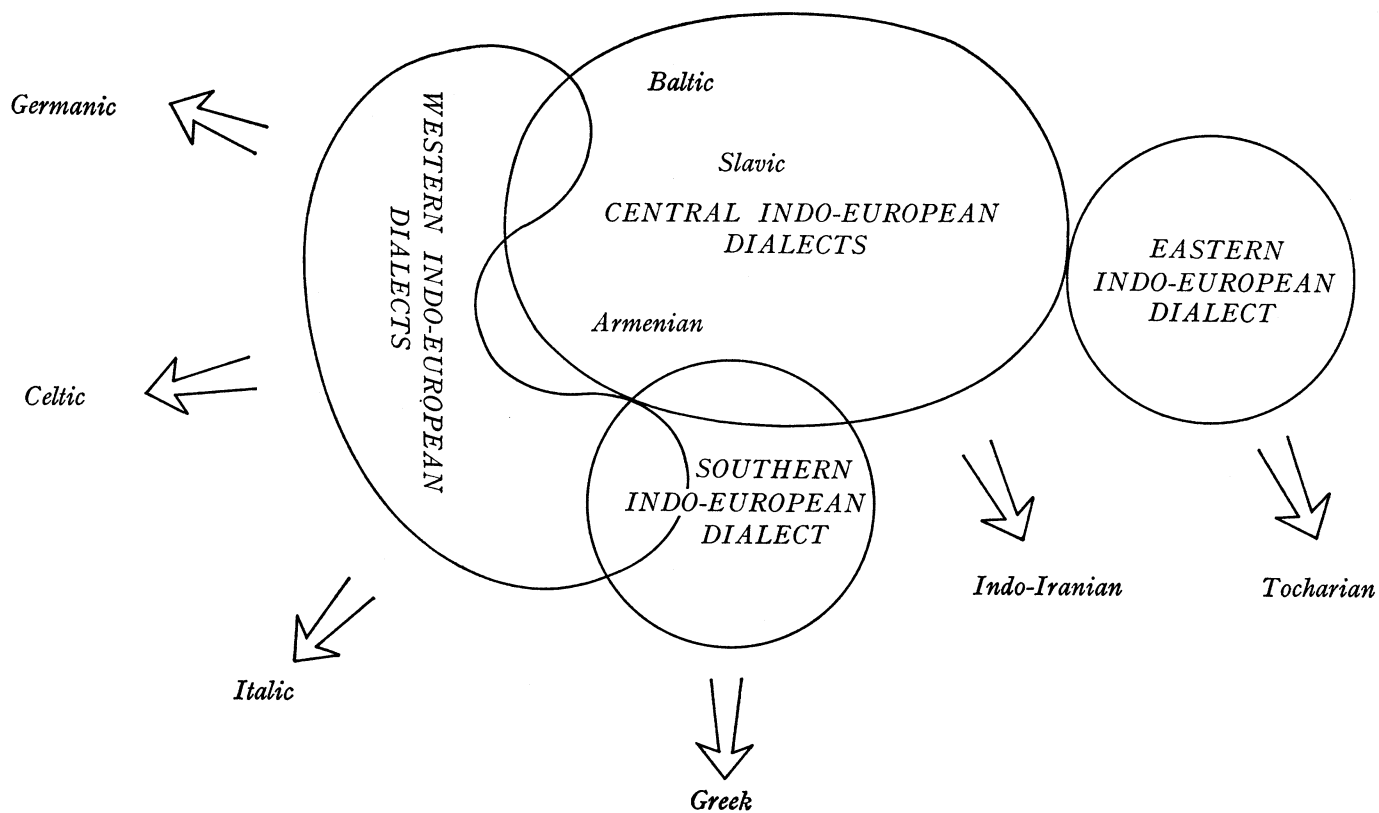
### B. Vowels:

<i>e</i>	<i>o</i>	<i>a</i>	<i>i</i>	<i>u</i>
<i>e̊</i>	<i>o̊</i>	<i>å</i>	<i>i̊</i>	<i>ů</i>

### C. Resonants:

*y w m n l r*

6. *Dialects of Disintegrating Indo-European* (cf. BURROW 1973: 12f.):



6.2. Phonemes: unchanged (cf. § 3.2).

6.3. Suprasegmentals:

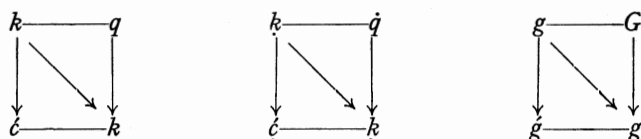
- A. Stress: non-distinctive;
- B. Pitch: applied only to vowels; distribution partially correlated with vowel gradation except in Pre-Balto-Slavic, where the distribution is correlated with vowel length.
- C. Quantity: open syllables ending in a short vowel are metrically short; open syllables ending in a long vowel and closed syllables are metrically long (cf. LEHMANN 1952: § 2.4).

6.4. Laryngeals are lost at the beginning of a word when before a vowel and after vowels when a non-syllabic follows. When a laryngeal is lost between a short vowel and a non-syllabic, the vowel is lengthened:

<i>HeC-</i>	>	<i>eC-</i>		<i>-eHC-</i>	>	<i>-e·C-</i>
<i>HoC-</i>	>	<i>oC-</i>		<i>-oHC-</i>	>	<i>-o·C-</i>
<i>HaC-</i>	>	<i>aC-</i>		<i>-aHC-</i>	>	<i>-a·C-</i>
<i>HiC-</i>	>	<i>iC-</i>		<i>-iHC-</i>	>	<i>-i·C-</i>
<i>HuC-</i>	>	<i>uC-</i>		<i>-uHC-</i>	>	<i>-u·C-</i>

Laryngeals remain in all other positions. Cf. LEHMANN (1952: § 15.6E.b).

6.5. The labialized post-velars become delabialized and fall together with the plain velars. This change causes the palatals to become phonemic:



6.6. In addition to causing the compensatory lengthening of short vowels, the loss of pre-consonantal laryngeals also caused a shift of high pitch to the newly formed long monophthongs in Pre-Balto-Slavic. This pitch shift left low pitch on short monophthongs and diphthongs. Cf. SHEVELOV (1964: 70).

6.7. The laryngeals merge into *h* (cf. SZEMERÉNYI 1972b: 125). *h* has a vocalic allophone, *h̥* (ə).

6.8. Non-Central Dialects of Disintegrating Indo-European:

A. Consonants:

<i>b</i>	<i>p</i>	<i>d</i>	<i>t</i>	<i>g</i>	<i>k</i>	<i>G</i>	<i>q</i>	
			<i>t̥</i>		<i>k̥</i>		<i>q̥</i>	
			<i>s</i>					<i>h</i> [ <i>h</i> , <i>h̥</i> ]

## B. Vowels:

*e o a i u*  
*e· o· a· i· u·*

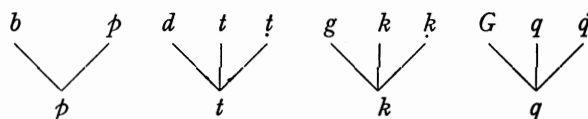
## C. Resonants:

*y w m n l r*

6.9. The most significant difference between the phonemic systems of the Central Dialects and the Non-Central Dialects of Disintegrating Indo-European was in the treatment of the velars and the labialized post-velars. In the Non-Central Dialects, the labialized post-velars did not become delabialized, and the palatals remained sub-phonemic.

7. *Development of the Consonants in the Daughter Languages.*

7.1. Tocharian: The voiced stops are devoiced and the glottalized stops are deglottalized:

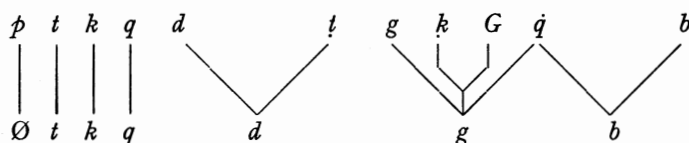


7.2. Germanic: The three series are kept distinct. *p*, *t*, *k*, and *q* become aspirated throughout and then pass to *φ*, *θ*, *χ*, and *χw*. The glottalized stops become deglottalized, and the voiced stops develop fricative allophones.

7.3. Greek: The voiceless stops remain unchanged. The voiced stops first become aspirated voiceless stops, and the glottalized stops then become voiced stops (cf. HOPPER 1973: § 3.3.2).

7.4. Italic: The Italic developments are identical to those found in Greek except that *ph*, *th*, *kh*, and *qh* develop fricative allophones.

7.5. Celtic: The glottalized dentals and velars merge with their plain voiced counterparts. *q* becomes *b* initially and medially after consonants but *g* elsewhere:



7.6. Balto-Slavic: The voiceless stops remain, but the glottalized stops become voiced stops and merge completely with the plain voiced stops.

7.7. Armenian: The three series are kept distinct.

- A.  $p, t, \acute{c}, k > h(w), th, s, kh$
- B.  $\acute{t}, \acute{c}, \acute{k} > t, c, k$
- C.  $b, d, \acute{g}, g > b, d, j(z), g(f, \acute{z})$

7.8. Indo-Iranian: It is necessary to assume that the original system remained intact in Indo-Iranian except that the voiceless aspirates became phonemic. After separation, the Iranian branch developed along lines similar to the Balto-Slavic languages, while the Indian branch underwent a modification of the stop system under the influence of the native Indian languages.

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